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# TESTING AS A PART OF MILITARY CLASSIFICATION

BY THE STAFF, PERSONNEL RESEARCH SECTION, CLASSIFICATION AND REPLACEMENT BRANCH, THE ADJUTANT GENERAL'S OFFICE

## GENERAL

THE construction of psychological tests for use in the classification and assignment of Army personnel is a function of the Personnal Research Section of the Classification and Replacement Branch, The Adjutant General's Office, War Department. The Classification and Replacement Branch is responsible for developing procedures for classifying and assigning all men in the Army with the exception of those in the flight crews of the Air Forces; it develops the policies and prepares the regulations which are used by classification officers in the field. An organizational and functional chart (Fig. 1) of the Personnel Research Section accompanies this article.

The two main objectives of classification are to conserve manpower and expedite training; it is a process through which pertinent data concerning each enlisted man are validly obtained and accurately recorded for use as a basis in making the assignment in which he will be of greatest value to the Service. Tests are employed at every stage of the complex classification process which continues throughout each man's military career. The personnel consultant and the classification and assignment officers in the induction stations, the reception centers and the replacement training centers of the Arms and Services, and in the tactical units and posts administer tests as an integral part of classification and assignment. The principal divisions and stages of the personnel classification system are indicated in Fig. 2.

Army needs dictate the types of tests in use. The number of tests of all types used in the Army has steadily increased since the initiation of the present classification system. Current tests and procedures

are of many varieties: written tests, oral tests, performance tests and standardized interviews. In general, tests are designed to be objective, specific and suitable for group administration. Practically all may be scored either by machine or by hand-applied stencils, and, with few exceptions, raw scores can be converted to standard scores and Army grades, which have a common meaning and interpretation throughout the Service. It is important to understand that tests are only part of the classification or selection process and that they are always used in conjunction with ratings made by trained interviewers, commanding officers under whom the man is serving, or, in the case of officer candidates, special boards of selection.

### Procedure in Test Development

After the need for a new test has been recognized and the project has been approved for development, the first step in construction is the determination of its type and scope, based on an analysis of the activities or job for which the test will select men. Then test items are written; in this process, technical experts and the technical literature are consulted, and available tests of the same nature are reviewed. After the items have been reviewed, the test is issued in a preliminary form and tried out on a sample Army population similar to that for which it is ultimately intended. Data obtained in this manner are then analyzed to obtain measures of the reliability and validity of the trial test. The difficulty of items is determined, and each is analyzed to determine the degree to which the right answer discriminates between individuals who score highest and lowest on the whole test. The reliability of the test as a whole is computed, generally by the Kuder-Richardson method. Studies of validity are made by correlating the score on the whole test with, and by analyzing the relation of each test item to, an outside criterion such as a rating of job performance or final grades in special Army training. The results of these statistical analyses determine what further work is necessary to develop the final test form and which items should be included.

Once the final test has been reproduced, it is administered to a new sample population for the purpose of standardization. The standardization of Army tests is essentially a process of constructing a framework for the interpretation of test performance which will apply to men at all levels. For tests of Army-wide usefulness, the standard group is selected to represent all levels of performance in the proportion in which they are found in the Service. When a test is constructed to measure a skill specific to some section of the Army, the standard group is selected from that section. On this basis, raw scores are converted to standard scores with a mean of 100 and a standard deviation of 20. Test scores may also be expressed in terms of five grade levels: I—standard scores of 130 and above; II—standard scores from 110 to 129; III—standard scores from 90 to 109; IV—standard scores from 70 to 89; V—standard scores of 59 and below.

In addition to standard scores, some qualifying or critical score may also be necessary, but such a score is often subject to change, depending upon Army needs. For example, qualifying scores may be raised or lowered according to the number of men available for the training involved. After a test is in operation, further checks are made to determine validity under actual operating conditions, to indicate need for revision as conditions change, to study trends in selected populations, and to determine the possible usefulness of the test in other fields. Typical steps in test development are shown in Fig. 3.

### Typical Tests Constructed

*Army General Classification Test* (GCT, Forms 1a, 1b, 1c, 1d). This test of general ability is given at reception centers to all men able to speak and read English. It contains vocabulary, arithmetic and box counting items arranged in spiral omnibus form; it is graded to include all levels of mental ability. The GCT can be administered, including practice time, in one hour.

*Mechanical Aptitude Test* (Forms MA-1, MA-2, MA-3, MA-4). This test is designed to predict potential success in learning general mechanical duties. The types of items in the four forms vary: MA-1 includes mechanical movements, surface development and shop mathematics; MA-2 and 3 include mechanical information, surface development and mechanical comprehension; MA-4 includes tool recognition, mechanical comprehension and surface development. The first three forms may be scored by parts as well as by the total, and these part scores used in special selection.

*Radiotelegraph Operator Aptitude Test* (ROA-1, X-1). At the present time, because sufficient operators are not available to the Army, this test is given at reception centers to all men who score above 80 on the General Classification Test. ROA-1, X-1 contains 156 items, each consisting of two code patterns sounded in succession; the man tested is required to decide whether the two patterns are the same (mark YES) or different (mark NO). The items vary in difficulty, and each man tries all of them. The test is available on phonograph records and can be given in this way to groups of 100 to 150 men.

*Achievement and Trade Knowledge Tests.* Various educational achievement tests are used when there is need for men with knowledge of particular academic subjects. Trade knowledge tests are used to select for special training men sufficiently informed about particular jobs.

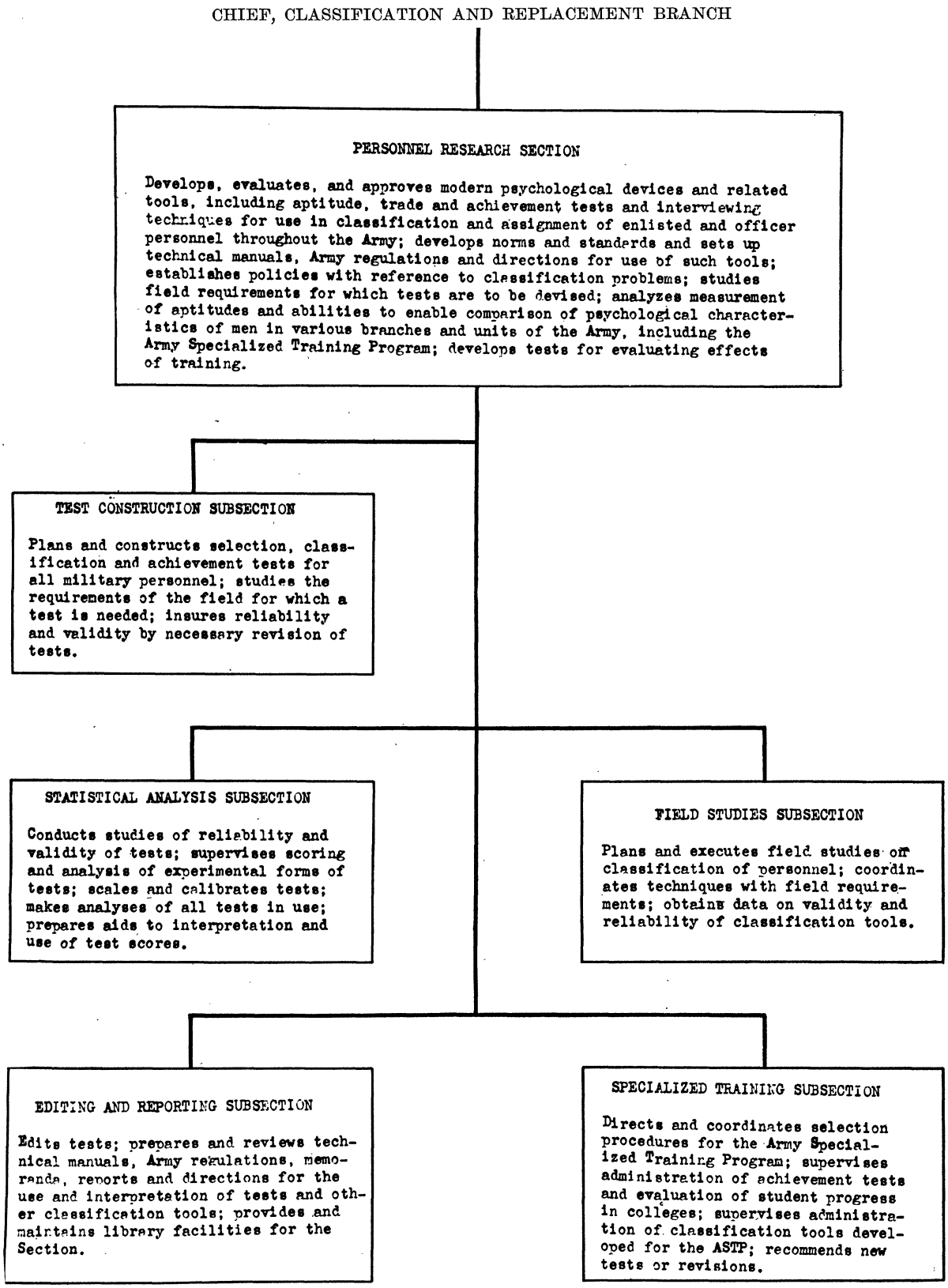
CHIEF, CLASSIFICATION AND REPLACEMENT BRANCH
PERSONNEL RESEARCH SECTION
Develops, evaluates, and approves modern psychological devices and related tools, including aptitude, trade and achievement tests and interviewing techniques for use in classification and assignment of enlisted and officer personnel throughout the Army; develops norms and standards and sets up technical manuals, Army regulations and directions for use of such tools; establishes policies with reference to classification problems; studies field requirements for which tests are to be devised; analyzes measurement of aptitudes and abilities to enable comparison of psychological characteristics of men in various branches and units of the Army, including the Army Specialized Training Program; develops tests for evaluating effects of training.
TEST CONSTRUCTION SUBSECTION
Plans and constructs selection, classification and achievement tests for all military personnel; studies the requirements of the field for which a test is needed; insures reliability and validity by necessary revision of tests.
STATISTICAL ANALYSIS SUBSECTION
Conducts studies of reliability and validity of tests; supervises scoring and analysis of experimental forms of tests; scales and calibrates tests; makes analyses of all tests in use; prepares aids to interpretation and use of test scores.
FIELD STUDIES SUBSECTION
Plans and executes field studies on classification of personnel; coordinates techniques with field requirements; obtains data on validity and reliability of classification tools.
EDITING AND REPORTING SUBSECTION
Edits tests; prepares and reviews technical manuals, Army regulations, memoranda, reports and directions for the use and interpretation of tests and other classification tools; provides and maintains library facilities for the Section.
SPECIALIZED TRAINING SUBSECTION
Directs and coordinates selection procedures for the Army Specialized Training Program; supervises administration of achievement tests and evaluation of student progress in colleges; supervises administration of classification tools developed for the ASTP; recommends new tests or revisions.

FIG. 1

## FLOW CHART — ARMY CLASSIFICATION SYSTEM

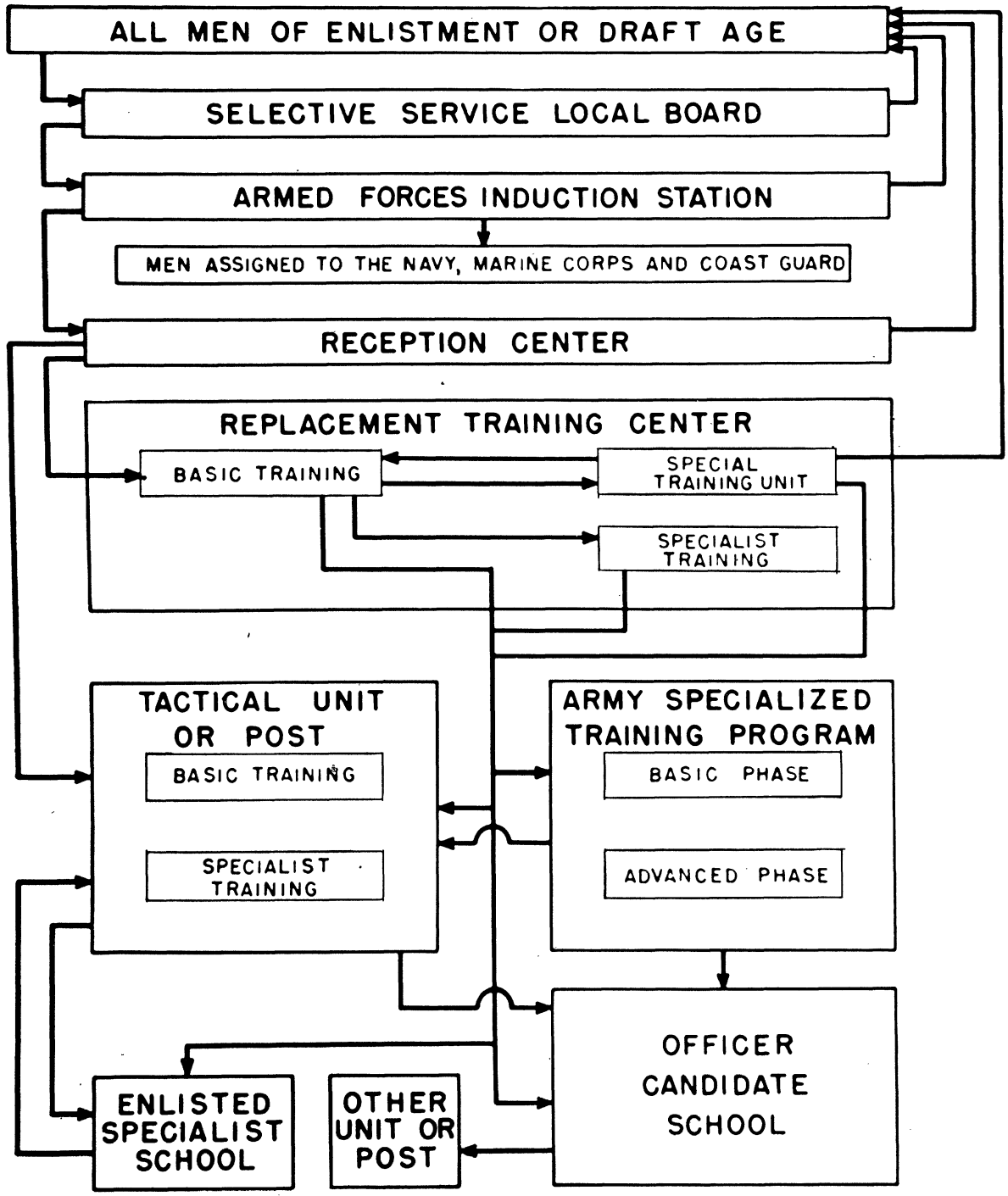


FIG. 2

This chart is intended to illustrate only the major agencies and organizations through which a man may pass or to which he may be assigned in the process of Army classification. Military necessity, local conditions, or special requirements of some arms or services make it impossible to show more than the usual stages involved.

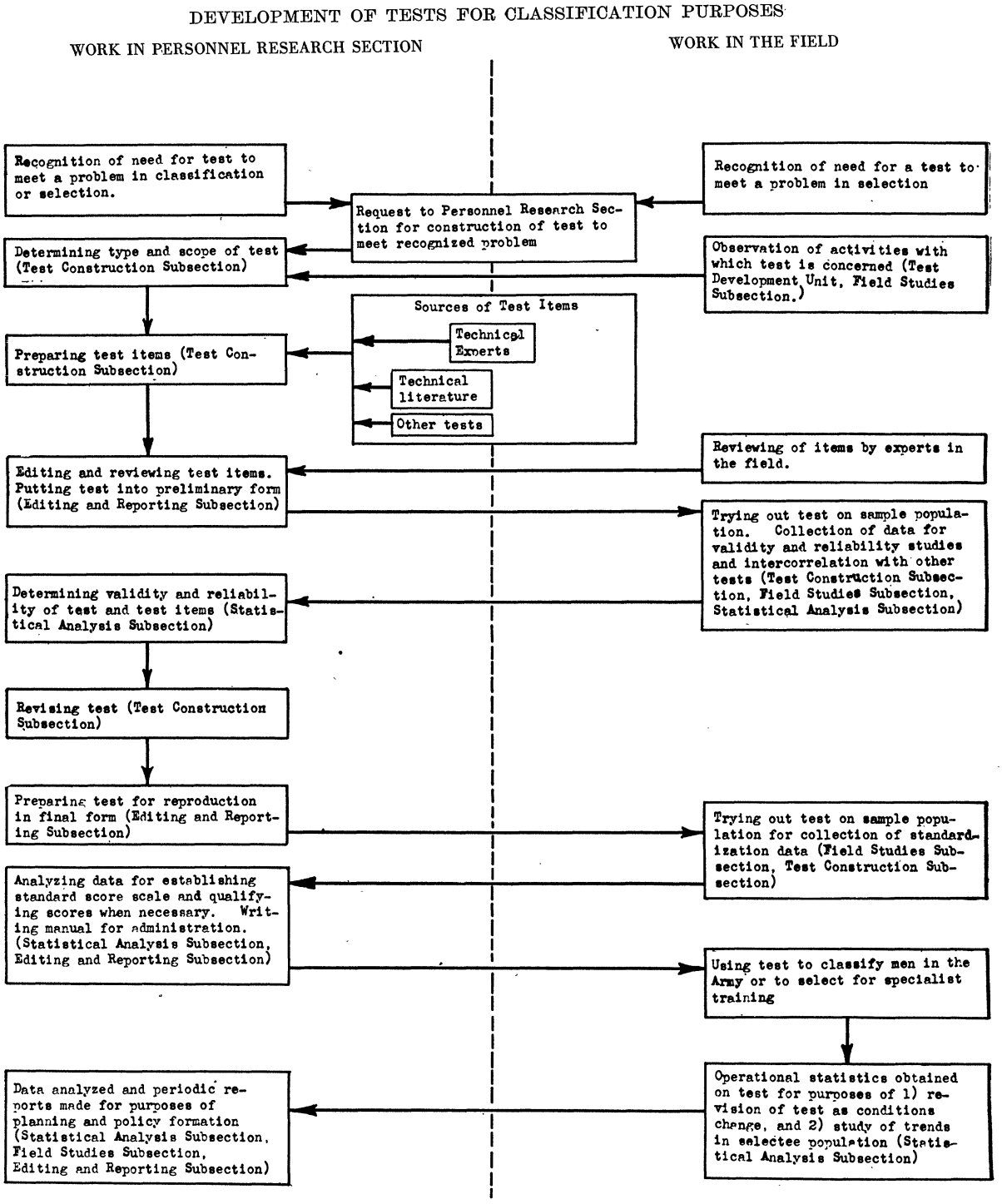


FIG. 3

*Tests for the WAAC.* Women applying for the WAAC are first given a mental alertness test to screen out the unfit. This test includes six types of items: information, vocabulary, arithmetic, judgment, proverb interpretation and comprehension of graphs and tables. A classification test is later given, in addition to special aptitude and proficiency tests. The aptitude tests used are Mechanical Aptitude, MA-4, Clerical Aptitude, CA-2, X-2, and the Radiotelegraph Operator Aptitude Test ROA-1, X-1. Written and oral

proficiency tests are used to check the technical knowledge of the women in radio repair, automotive mechanics, driver information and other skills.

*Warrant Officer Examinations.* Examinations of technical ability in approximately thirty technical specialties of warrant officers, including auditing and accounting, supply in various arms, engineering, photography and cryptography, have been prepared. These tests are kept up-to-date to take account of changes in methods and duties incident to the development of the Army.

*Army Specialized Training Program Tests.* These tests are to assist in the selection of men from among present enlisted personnel of the Army and young men between the ages of 18 and 22 who will be tested after induction and basic military training. Men selected by these tests are eligible for college training in engineering, medicine, chemistry, physics, psychology and foreign languages as part of their Army service. Further tests will be constructed and used periodically to measure their achievement in these subjects.

The following is a fairly complete list of tests developed up to the present time for Army usage:

*Classification Tests*
- General Classification Test
- Non-Language Test
- Visual Classification Test
- Higher Examination
- Officer Candidate Test
- Women's Classification Test (Mental Alertness Test)
- Army Information Sheet (minimum literacy test)

*Aptitude Tests*
- Mechanical Aptitude Test
- Clerical Aptitude Test
- Radiotelegraph Operator Aptitude Test
- Code Learning Test
- Battery of Tests for Combat Intelligence
  - Identification of Aerial Photographs
  - Map Identification
  - Route Tracing
  - Battle Maps
  - Perception of Detail
  - Map Reading
  - Map Orientation

*Educational Achievement Examinations*
- Algebra
- Arithmetic
- English Grammar and Composition
- French
- General History
- German
- Inorganic Chemistry
- Physics
- Plane and Solid Geometry
- Spanish
- Trigonometry
- United States History
- Combined Algebra, Trigonometry and Geometry

*Trade Knowledge Tests*
- General Automotive Information Test
- General Electricity and Radio Information Test
- General Radio Information Test
- Driver and Automotive Information Test

*Warrant Officer Examinations*
- About 30 technical examinations

*Army Specialized Training Program Tests*
- Army Specialized Training Program Test
  (achievement tests in each subject taught under the program are under construction)

# WAR RÔLE OF A GEOLOGICAL SURVEY[1]

By Dr. ARTHUR BEVAN

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THE chief rôle of a Geological Survey in modern industrial society is to get all the obtainable data about all the earth materials in all the domain served by that Survey. To meet the opportunities and obligations of this rôle, each official Survey ideally must get all these data with sufficient accuracy and in adequate detail to satisfy promptly and completely all the conceivable immediate demands. That Survey must also anticipate—even stimulate—the rational future needs of expanding mineral and related industries and interdependent society.

Those earth materials, which are so indispensable to the smooth functioning, and even the existence, of modern society and its industrial and governmental economies, are the familiar daily grist of the technical mills of each Geological Survey, whether provincial, state or national. They include at the base the "precious metals"—precious not in the technical sense but in the social sense that to modern society they are even more precious than gold and silver or rubies and diamonds. Those metals are obviously the birthstones of the "Age of Metals," as well as the structural framework for most industrial achievements. Included also among the grist of a Geological Survey are the essential nonmetals in great diversity, the priceless mineral fuels and sources of power, and, by no means least, the absolutely vital ground-water supplies. They are the functioning "corpuscles" in the "life blood" of modern industry.

[1] Address at the annual meeting of the Association of American State Geologists, Washington, D. C., February 19, 1943.